



# **Air Quality Permitting Statement of Basis**

September 16, 2005

**Tier II Operating Permit and  
Permit to Construct No. T2-050030**

**Northwest Pipeline Corporation  
Owyhee County Compressor Station**

**Facility ID No. 073-00003**

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**Final**

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## **Acronyms, Units, and Chemical Nomenclature**

<b>AIRS</b>	<b>Aerometric Information Retrieval System</b>
<b>AQCR</b>	<b>Air Quality Control Region</b>
<b>CO</b>	<b>carbon monoxide</b>
<b>DEQ</b>	<b>Idaho Department of Environmental Quality</b>
<b>IDAPA</b>	<b>a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act</b>
<b>NWP</b>	<b>Northwest Pipeline Corporation</b>
<b>PTC</b>	<b>permit to construct</b>
<b>PSD</b>	<b>Prevention of Significant Deterioration</b>
<b>SIC</b>	<b>Standard Industrial Classification</b>
<b>SM</b>	<b>synthetic minor</b>
<b>TAPs</b>	<b>toxic air pollutants</b>
<b>T/yr</b>	<b>tons per any consecutive 12-month period</b>
<b>UTM</b>	<b>Universal Transverse Mercator</b>

## 1. PURPOSE

The purpose for this technical analysis is to satisfy the requirements of IDAPA 58.01.01.200 et seq and IDAPA 58.01.01.400 et seq of the *Rules* for PTCs and Tier II operating permits, respectively.

## 2. FACILITY DESCRIPTION

The Owyhee compressor station was originally constructed in 1968, and began operation in January of 1969. The facility is used to increase the operating pressure of a pipeline that delivers natural gas through Northwest Pipeline Corporation's (NWP) Reno Lateral. The natural gas received at the facility is compressed, metered, and discharged to a transmission pipeline. Electricity for the facility is supplied by a generator that uses the pipeline gas for fuel. A boiler is used to provide building heat, and a fuel gas heater is used to heat fuel gas for the turbines.

## 3. FACILITY / AREA CLASSIFICATION

The facility is not a major facility as defined by IDAPA 58.01.01.205, because its potential to emit is limited to less than the applicable major source threshold, 250 T/yr of a regulated NSR pollutant. The facility is not a major facility as defined by IDAPA 58.01.01.008.10, because its potential to emit is limited to less than all applicable Tier I major source thresholds. The AIRS facility classification is SM80 (i.e. potential to emit is greater than 80% of a Tier I major source threshold). The SIC code defining the facility is 4922, *Natural Gas Transmission*.

This permit revision does not change NWP's AIRS facility classification; therefore, the AIRS information has not been updated.

The facility is located in Owyhee County, in AQCR 63, and UTM Zone 11. The area is classified as unclassifiable for all federal and state criteria air pollutants.

## 4. APPLICATION SCOPE

NWP was issued Tier II Operating Permit and Permit to Construct No. T2-020044 for its Owyhee Compressor Station on January 21, 2005 (hereafter referred to as the "existing permit"). The existing permit includes permit conditions that regulate the facility's three electrical generators. NWP has submitted an application to revise two of the permit conditions related to the generators. NWP asserts that compliance cannot be demonstrated as currently written.

In addition, DEQ has updated the Facility-wide Permit Conditions and the General Provisions to reflect those of a Tier II operating permit and permit to construct. Revisions to the existing permit are addressed in Section 5.6 of this document.

### 4.1 Application Chronology

June 14, 2005	DEQ receives an application for a permit revision
July 14, 2005	DEQ determines application complete
August 31, 2005	DEQ provides draft permit to facility and DEQ's Boise Regional Office for review

## 5. PERMIT ANALYSIS

This section of the statement of basis describes the regulatory requirements for this permitting action:

## 5.1 Equipment Listing

- Cummins GTA12 Generator Engine (Unit 5)
- Cummins GTA12 Generator Engine (Unit 6)
- Cummins G855 Generator Engine (Unit 7)

## 5.2 Project Analysis

The existing permit limits CO emissions from generator operations to 22.74 T/yr (Permit Condition 4.2). The limit was established using revised emission factors supplied by NWP to DEQ for the development of the existing permit (refer to the statement of basis for permit T2-020044). For reference, the limit was calculated as shown below. The difference, 22.5 T/yr and 22.74 T/yr, is due to rounding.

$$(1.71 \text{ lb CO} / \text{hr}) \times (8,760 \text{ hr} / \text{yr}) \times (1 \text{ T} / 2,000 \text{ lb}) = 7.5 \text{ T CO} / \text{yr}, \text{ for each generator}$$

$$(7.5 \text{ T CO} / \text{yr}) \times (3 \text{ generators}) = 22.5 \text{ T CO} / \text{yr}, \text{ for all three generators}$$

Permit Condition 4.4 requires that only one generator operate at any given time. As currently written, Permit Condition 4.4 presents a problem for NWP because there will be short periods of time when more than one generator engine will be running with only one of the units generating electricity (on load). These periods are for monthly equipment maintenance, whereby a unit is running for approximately 10 minutes a month to ensure its availability for power generation. It must be noted that the unit being checked for integrity is not generating electricity, thus fuel use and emissions are minimal. Other periods when two units are running simultaneously are during the load transfer periods from one unit to another. To provide continuous electrical power to the facility, a unit must be started and warm before a load transfer can take place. Once a unit is warm, the load is automatically transferred from the running unit to the most recently started. Once the load is switched, the unit is taken off load and is then run for approximately five minutes to cool down. The generator engines are able to run for months at a time ensuring that load transfer periods are minimized.

As currently written, Permit Condition 4.4 requires the following: *The permittee shall not operate more than one of the Cummins generator engines at the facility at any given time.*

NWP proposes to revise Permit Condition 4.4 to the following: *Except during periods of load transfer and equipment maintenance, the permittee shall not operate more than one of the Cummins generator engines at the facility at any given time.*

NWP proposal can be accommodated without any engineering or regulatory review because the existing CO limit already assumes that all three generators are operating concurrently and continuously. Review of the modeling conducted for the existing permit shows that a value of 5.19 lb/hr was used as the emissions input data for CO for the generators ( $1.71 \text{ lb/hr} \times 3 = 5.13 \text{ lb/hr}$ ). Again, the difference is rounding. Clearly, the modeling analysis assumes all three generators are operating at the same time. The results of the modeling analysis predict that the 1-hour and 8-hour CO impacts from facility-wide operations, which include all activities, are 18% and 33% of the NAAQS for CO. A copy of DEQ's modeling analysis is provided as the appendix of this document. As long as the facility complies with its permit, the facility cannot exceed the CO NAAQS. Likewise and with respect to TAPs, the statement of basis supporting the existing permit states that NWP's TAP analysis satisfied all requirements to the satisfaction of DEQ.

Compliance with the annual CO emissions limit will be determined through fuel usage monitoring and recordkeeping requirements for the generators. The existing compliance requirement, Permit Condition 4.6 requires the following.

#### Permit Condition 4.6

Permit Condition 4.6 in the existing permit is the monitoring and recordkeeping requirement for generator operations. As currently written, Permit Condition 4.6 requires the following: *The permittee shall monitor and record which of the generators is in operation at all times. The records shall clearly indicate the timeframes when each generator is in operation, sufficient to determine compliance with Permit Condition 4.4. The records shall be maintained in accordance with Permit Condition 2.10 and shall be made available to DEQ representatives for any on site inspection.*

Because it's been shown that the number of generators operating at any given time is irrelevant, this permit condition has been changed as requested by NWP. Permit Condition 4.6 in the revised permit requires the following: *The permittee shall monitor and record the annual fuel use for each generator. The fuel use records shall be used to calculate emissions sufficient to determine compliance with Permit Condition 4.2. The records shall be maintained in accordance with Permit Condition 2.10 and shall be made available to DEQ representatives for any on site inspection.*

NWP has installed fuel meters on the generator engines for annual fuel monitoring. Emissions from the generator engines will be calculated based on fuel usage records obtained annually. The unmanned facility is located in a very remote area of southern Idaho, with access limited by weather conditions. NWP will take readings at the beginning and end of each year to determine the previous years' fuel usage.

### **5.3 Emissions Inventory**

Emissions do not increase as a result of this permit revision; therefore, a new emissions inventory is not required.

### **5.4 Modeling**

Emissions do not increase as a result of this permit revision; therefore, a new ambient air quality modeling analysis is not required.

### **5.5 Regulatory Review**

This section describes the regulatory analysis of the applicable air quality rules with respect to this Tier II operating permit and permit to construct:

#### **IDAPA 58.01.01.209.04..... Revisions of Permits to Construct**

Permit Conditions 4.4 and 4.6 are permit to construct provisions of the existing permit. Because emissions are not increasing, the revised permit does not have to be made available for an opportunity for public comment or for a public comment period.

#### **IDAPA 58.01.01.404.04..... Permit Revision or Renewal**

This revision does not effect compliance with NWP existing permit. This revision clarifies generator operations so compliance can be more easily determined. An opportunity for public comment and a public comment period is not required because emissions are not increasing.

A permit revision is not one of listed permitting actions exempt from processing fees. Minimal engineering analysis was required for this revision; therefore, the appropriate processing fee is \$500.00.

## **5.6 Permit Conditions Review**

This section describes the changes made to the permit as a result of this modification. Existing permit conditions are identified as "Existing Permit Condition." Modified or revised permit conditions are identified similarly. Only the permit conditions that have changed are identified in this section. All other permit conditions remain unchanged.

Existing Permit Conditions 2.3 and 2.4 regulate odors from this facility and require recordkeeping of odor complaints. This facility is remotely located in Owyhee County. No residence is located nearby, nor is the property bisected by a roadway to which the public has access. Due to these facts, these permit conditions serve no regulatory purpose and require unnecessary recordkeeping. Therefore, these conditions have been deleted.

Existing Permit Condition 2.12, Obligation to Comply, is a redundant permit condition. The permit letter issued with the permit already requires that the facility comply with all applicable local, state, and federal rules and regulations.

Existing Permit Condition 4.4 requires that no more than one of the Cummins generator engines operate at the facility at any given time.

Revised Permit Condition 4.4 requires that no more than one of the Cummins generator engines operate at the facility at any given time except during periods of load transfer and equipment maintenance. This allows NWP to bring a generator on line as they take one off line.

Existing Permit Condition 4.6 requires that NWP monitor and record which generator is in operation at all times, and that it maintain documentation showing when each generator operates.

Revised Permit Condition 4.6 requires that NWP monitor and record the annual fuel use for each generator and then use the fuel records to calculate annual CO emissions. As discussed above, the number of generators that operate is irrelevant with respect to CO emissions and the resulting CO ambient impacts because the limit assumes all three operate at the same time. Using fuel data to calculate annual CO emissions sufficiently demonstrates compliance with the annual CO emissions limit.

## **6. FEE REVIEW**

This permitting action is a permit revision. A permit revision is not one of listed permitting actions exempt from processing fees. Minimal engineering analysis was required for this revision; therefore, the appropriate processing fee is \$500.00.

## **7. PERMIT REVIEW**

### **7.1 Regional Review of Draft Permit**

An electronic copy and a hard copy of this permit revision and statement of basis has been provided to the Boise Regional Office for review concurrently with the facility draft review.

## **7.2 Facility Review of Draft Permit**

A draft permit has been made available for facility review.

## **7.3 Public Comment**

Emissions are not increasing as a result of this permitting action; therefore, an opportunity for public comment and a public comment period are not required.

## **8. RECOMMENDATIONS**

Based on the permit application and review of state rules and federal regulation, staff recommends that DEQ issue final Tier II Operating Permit and Permit to Construct No. T2-050030 to NWP for the revisions described in this statement of basis. The project does not involve PSD permitting requirements and a public comment permit is not required.

BR/sd      Permit No. T2-050030      G:\Air Quality\Stationary Source\SS Ltd\T2\NWP Owyhee - T2-050030\Final\T2-050030 Final SB.doc



## **APPENDIX**

***DEQ AMBIENT AIR QUALITY MODELING MEMORANDUM – 4/21/2004***

**T2-050030**

## **MEMORANDUM**

**DATE:** April 21, 2004

**TO:** William Rogers, Permit Program Coordinator, Air Quality Division

**FROM:** Mary Anderson, Air Modeling Coordinator, Air Program Division *MA*

**PROJECT NUMBER:** T2-020044

**SUBJECT:** Atmospheric Dispersion Modeling Review for the Northwest Pipeline Corporation, Owyhee Compressor Station Tier II Operating Permit with Modification of the Generator Engines

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Kevin Schilling of the Technical Services Division performed the majority of the technical review for this project. This project was transferred to me on April 5, 2004. My technical review and this memo follows established program policy and guidance.

### **1.0 Summary**

Northwest Pipeline Corporation (NWP) submitted a Tier II operating permit application for their Owyhee Compressor Station located in Owyhee County, Idaho. They also submitted a Permit to Construct (PTC) application for a proposed modification. Air quality analyses involving atmospheric dispersion modeling of facility-wide emissions were submitted in support of the Tier II and PTC application to demonstrate that the stationary source would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and IDAPA 58.01.01.403.02).

The Department of Environmental Quality (DEQ) received a Tier II operating permit application from NWP on April 14, 2003. Cirrus Consulting, LLC (Cirrus), NWP's consultant, conducted the ambient air quality analyses. Dispersion modeling analyses of facility-wide emissions were used to demonstrate compliance with IDAPA 58.01.01.403.02. Revised analyses were received by DEQ on November 10, 2003, as part of a proposal to replace one of the Cummins GTA-12 generator engines with a Cummins G855 generator engine. This memorandum updates the August 1, 2003 modeling review memorandum.

During the initial review by Kevin Schilling, some issues were found with the modeling analysis. There was a question of whether certain modeled emissions parameters (primarily stack gas flow rates) of some sources reflected operational conditions of those sources. Questions also arose as to whether or not the receptor grid adequately addressed the maximum design concentration and whether ambient air occurred in the cavity regions of the building. To address these questions, a sensitivity analysis was performed by DEQ. Based on the results of the sensitivity analysis (see Section 4.0), DEQ has determined that the submitted modeling analysis demonstrated compliance with all applicable standards. However, the sensitivity analysis showed that the receptor grid submitted by the applicant may not be adequate for future applications.

### **2.0 Background Information**

#### **2.1 Applicable Air Quality Impact Limits**

The NWP Owyhee Compressor Station is located in Owyhee County, designated as an attainment or unclassifiable area for sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), lead (Pb), ozone (O<sub>3</sub>), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM<sub>10</sub>). There are no Class I areas within 10 kilometers of the facility. The applicable regulatory limits for this permit application are presented in Table 1.

<b>Table 1. APPLICABLE REGULATORY LIMITS</b>				
Pollutant	Averaging Period	Significant Contribution Levels ( $\mu\text{g}/\text{m}^3$ ) <sup>a, b</sup>	Regulatory Limit ( $\mu\text{g}/\text{m}^3$ ) <sup>c</sup>	Modeled Value Used <sup>d</sup>
PM <sub>10</sub> <sup>e</sup>	Annual	1	50 <sup>f</sup>	Maximum 1 <sup>st</sup> highest <sup>g</sup>
	24-hour	5	150 <sup>h</sup>	Maximum 6 <sup>th</sup> highest <sup>i</sup> Highest 2 <sup>nd</sup> highest <sup>j</sup>
CO	8-hour	500	10,000 <sup>k</sup>	Highest 2 <sup>nd</sup> highest <sup>l</sup>
	1-hour	2000	40,000 <sup>k</sup>	Highest 2 <sup>nd</sup> highest <sup>l</sup>
NO <sub>2</sub>	Annual	1	100 <sup>m</sup>	Maximum 1 <sup>st</sup> highest <sup>n</sup>
a. IDAPA 58.01.01.006.93 b. Micrograms per cubic meter c. IDAPA 58.01.01.577 d. The maximum 1 <sup>st</sup> highest modeled value is always used for significant impact analysis. e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers f. Never expected to be exceeded in any calendar year. g. Concentration at any modeled receptor. h. Never expected to be exceeded more than once in any calendar year. i. Concentration at any modeled receptor when using five years of meteorological data. j. The highest 2 <sup>nd</sup> high is considered to be conservative for five years of meteorological data. k. Not to be exceeded more than once per year.				

## 2.2 Background Concentrations

Background concentrations were revised for all areas of Idaho by DEQ in March 2003<sup>1</sup>. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Initially, background concentrations for rural/agricultural areas were used for the facility. Further assessment by DEQ indicates that rural/remote concentrations are more appropriate for the area. Table 2 lists the rural/remote default background concentrations.

<b>Table 2. BACKGROUND CONCENTRATIONS</b>		
Pollutant	Averaging Period	Background concentrations ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>
PM <sub>10</sub>	24-hour	43
	Annual	9.6
CO	1-hour	3,600
	8-hour	2,300
SO <sub>2</sub>	3-hour	34
	24-hour	26
	Annual	8
NO <sub>2</sub>	Annual	4.3
Lead	quarterly	0.03
a. Micrograms per cubic meter.		

## 3.0 Assessment of Submitted, Certified Modeling Analysis

This section documents the assessment of the application materials as submitted and certified by the applicant

### 3.1 Modeling Methodology

Cirrus Consulting, LLC (Cirrus), conducted the modeling analysis. Table 3 presents the modeling assumptions and parameters used by the applicant as well as DEQ's review and determination of those assumptions and parameters.

<sup>1</sup> Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

<b>Table 3. MODELING PARAMETERS</b>		
<b>Parameter</b>	<b>What Facility Submitted</b>	<b>DEQ's Review/Determination</b>
Modeling protocol	A modeling protocol was submitted	It was followed by the applicant
Model Selection	ISCST3	Appropriate, however see Section 4.0 DEQ Sensitivity Analysis for further discussion
Meteorological Data	Boise surface and upper air 1987 - 1991	Appropriate, most representative of data available
Model Options	Regulatory defaults used	Appropriate
Land Use	Rural	Appropriate
Complex Terrain	Complex terrain is presented and included	Appropriate
Building Downwash	Building downwash was included	Appropriate
Receptor Network	50-meter spacing on ambient air boundary 100-meter out to 1000 meters 500-meter out to 8000 meters	During the initial review, Kevin Schilling questioned whether this receptor network is sufficient to adequately address the maximum design concentration. See Section 4.0 Sensitivity Analysis for further discussion.
Facility Layout	N/A	The facility layout used in the model was verified by using the scaled plot plan submitted by the applicant

### 3.2 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. If modeled emissions rates were equal to or slightly greater than the facility's emissions calculated in the permit application or the permitted allowable rate, then it was determined to be appropriate.

Table 4 provides criteria pollutant emissions quantities for short-term and long-term averaging periods. The original permit application indicated the presence of a second Cummins GTA-12 Generator (emissions point S5). This source was not included in the dispersion modeling analyses because only one generator will operate at any given time. The November submittal proposed replacing one of the GTA-12 generator engines with a G855 generator engine. The emissions inventory indicated the only emissions increase associated with the change is oxides of nitrogen (NO<sub>x</sub>). NO<sub>x</sub> was the only pollutant modeled for the November submittal. NWP later indicated they would not be removing one of the GTA-12 generator engines after adding the G855 engine; however, only one of the three engines would operate at any given time. They also indicated the Hercules emergency generator would be removed from the facility. Revised modeling was not conducted since this change only resulted in a reduction of emissions.

Table 4. CRITERIA POLLUTANT EMISSIONS RATES USED FOR MODELING (SHORT-TERM AND LONG-TERM)					
Source (Id Code)	Location (UTM) <sup>a</sup>	Rate Used for Modeling (lb/hr) <sup>b</sup>			
		PM <sub>10</sub> <sup>c</sup>	CO <sup>d</sup>	SO <sub>2</sub> <sup>e</sup>	NO <sub>x</sub> <sup>f</sup>
Solar Saturn 10-T1302 Turbine (S1)	E540,312 N4,667,671	0.08	4.57	0.04	4.11
Solar Saturn 10-T1302 Turbine (S2)	E540,315 N4,667,675	0.08	4.57	0.04	4.11
Solar Saturn 10-T1302 Turbine (S3)	E540,324 N4,667,694	0.08	4.57	0.04	4.11
Cummins GTA-12 and G855 Generator (S4)	E540,275 N4,667,700	0.01 <sup>g</sup>	5.19 <sup>h</sup>	0.001 <sup>h</sup>	8.29 <sup>h</sup>
Sellers Boiler (S6)	E540,278 N4,667,706	0.015	0.17	0.001	0.20
P&A Fuel Gas Heater (S7)	E540,294 N4,667,740	0.003	0.03	0.0002	0.03
Hercules Emergency Generator (S8)	E540,268 N4,667,675	0.009	3.41	0.0003	0.114 <sup>i</sup>
<b>TOTALS</b>		<b>0.28</b>	<b>22.51</b>	<b>0.13</b>	<b>20.96</b>
<sup>a.</sup> Universal Transverse Mercator <sup>b.</sup> Pounds per hour <sup>c.</sup> Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers <sup>d.</sup> Carbon monoxide <sup>e.</sup> Sulfur dioxide <sup>f.</sup> Oxides of nitrogen <sup>g.</sup> Emissions from GTA-12 generator engine <sup>h.</sup> Emissions from G855 generator engine <sup>i.</sup> Based on emissions from 500 hours divided by 8,760					

Estimated sulfur dioxide (SO<sub>2</sub>) total emissions are less than the 0.2 lb/hr modeling threshold identified in DEQ's *State of Idaho Air Quality Modeling Guideline*; therefore, a dispersion modeling analysis was not necessary to demonstrate compliance with SO<sub>2</sub> NAAQS.

### 3.3 Emission Release Parameters

Table 5 provides emissions release parameters, including stack location, stack height, stack diameter, exhaust temperature, and exhaust velocity submitted by the applicant. There was no basis given for most flow parameters used in the modeling analyses submitted. Parameters for the G855 engine were also modified for the DEQ verification analyses. The 1005 K stack temperature used by Cirrus was the maximum exhaust temperature given in a submitted specification sheet and did not account for heat loss between the manifold and release point at the top of the stack. As a sensitivity test, DEQ used the 672 K temperature associated with the GTA-12 engine. The flow velocity was modified on the basis of the 970-acfm continuous flow listed on the specification sheet. The flow velocity used by Cirrus was based on the maximum flow rather than typical flow. DEQ performed a sensitivity analysis on these parameters using DEQ calculated flow parameters based on a combustion evaluation, as described in the main text of the Technical Analysis for Northwest Pipeline, Owyhee (May 2003). See Section 4.0 for further discussion.

<b>Table 5. EMISSIONS AND STACK PARAMETERS</b>					
<b>Release Point / Location</b>	<b>Source Type</b>	<b>Stack Height (m)<sup>a</sup></b>	<b>Modeled Diameter (m)</b>	<b>Stack Gas Temp. (K)<sup>b</sup></b>	<b>Stack Gas Flow Velocity (m/sec) <sup>c</sup></b>
Solar Saturn 10-T1302 Turbine (S1)	Point	6.10	0.69	727	30.2
Solar Saturn 10-T1302 Turbine (S2)	Point	6.10	0.69	727	30.2
Solar Saturn 10-T1302 Turbine (S3)	Point	6.10	0.69	727	30.2
Cummins GTA-12 Generator (S4)	Point	4.57	0.15	672	25.4
Cummins G855 Generator (S4)	Point	6.1	0.15	1005	29
Sellers Boiler (S6)	Point	4.57	0.30	422	0.7
P&A Fuel Gas Heater (S7)	Point	3.05	0.15	450	0.5
Hercules Emergency Generator (S8)	Point	4.57	0.08	561	35.6
a. Meters b. Kelvin c. Meters per second					

### 3.4 Results

These results are based on the modeling files submitted by the applicant and reviewed by DEQ.

#### 3.4.1 Full Impact Analysis Results

<b>Table 6. FULL IMPACT ANALYSIS RESULTS</b>						
<b>Pollutant</b>	<b>Averaging Period</b>	<b>Facility Ambient Impact (µg/m<sup>3</sup>)</b>	<b>Background Concentration (µg/m<sup>3</sup>)</b>	<b>Total Ambient concentration (µg/m<sup>3</sup>)</b>	<b>NAAQS (µg/m<sup>3</sup>)</b>	<b>Percent of NAAQS</b>
PM <sub>10</sub>	24-hour	2.22	43	45.22	150	30
	Annual	0.60	9.6	10.2	50	20
CO	1-hour	3,717	3,600	7,317	40,000	18
	8-hour	1,002	2,300	3,302	10,000	33
NO <sub>2</sub>	Annual	48.3 <sup>a</sup>	4.3	52.8	100	53
a The ambient ratio method (ARM) factor of 0.75 has been used to convert NO <sub>x</sub> results to NO <sub>2</sub> per 40 CFR 51 Appendix W Guideline on Air Quality Models.						

### 4.0 DEQ Sensitivity Analysis Results

DEQ performed a sensitivity analysis to determine whether or not the questions that arose during the review of the modeling analysis effected the design concentration and the demonstration of compliance.

As discussed above, several questions arose during the review of the modeling analysis. These questions included the following: whether or not ambient air occurred in the cavity region of the buildings, the adequacy of the receptor grid to resolve the maximum design concentration, exit temperature for the G855 engine, and the flowrates for the G855 engine, GTA-12 engine, Sellers Boiler, P&A fuel gas heater, and the Hercules emergency generator. To ensure that these questions did not make a difference in the demonstration of compliance, DEQ performed a sensitivity analysis for these parameters. Table 7 presents the changes in modeling parameters. All other modeling assumptions/parameters used by the applicant remained unchanged in this sensitivity analysis. As seen in Table 8, the results of the sensitivity analysis are essentially identical to those submitted by the applicant.

Table 7. SUMMARY OF SENSITIVITY ANALYSIS		
Parameter	Modeling files submitted by applicant	Changed in Sensitivity analysis
Exit temperature for G855 engine	1005 K	672 K
Flowrate for GTA-12 engine	25.4 m/s	19.6 m/s
Flowrate for G835	29 m/s	25 m/s
Flowrate for Sellers Boiler	0.7 m/s	4.3 m/s
Flowrate for P&A fuel gas heater	0.5 m/s	3.5 m/s
Flowrate for Hercules emergency generator	35.6 m/s	43.0 m/s
Model used	ISCST3	ISC-prime
Receptor grid used	50-meter spacing on ambient air boundary 100-meter out to 1000 meters 500-meter out to 8000 meters	25-meter on boundary, out to 100 meters 50-meter out to 300 meters 100-meter out to 1000 meters 500-meter out to 8000 meters

Table 8. RESULTS OF THE SENSITIVITY ANALYSIS							
Pollutant	Averaging Period	Submitted by Applicant ( $\mu\text{g}/\text{m}^3$ )	Sensitivity Analysis ( $\mu\text{g}/\text{m}^3$ )	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Total Ambient concentration ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	Percent of NAAQS
PM <sub>10</sub>	24-hour	2.22	3.30	43	46.3	150	31
	Annual	0.60	0.68	9.6	10.3	50	21
CO	1-hour	3,717	802	3,600	4,402	40,000	11
	8-hour	1,002	455	2,300	2,755	10,000	28
NO <sub>2</sub>	Annual	48.5 <sup>a</sup>	67.5 <sup>a</sup>	4.3	71.8	100	72

a. The ambient ratio method (ARM) factor of 0.75 has been used to convert NO<sub>x</sub> results to NO<sub>2</sub> per 40 CFR 51 Appendix W Guideline on Air Quality Models.